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DEB TYPE I ALARM STATUS UNIT TECHNICAL MANUAL.(U)

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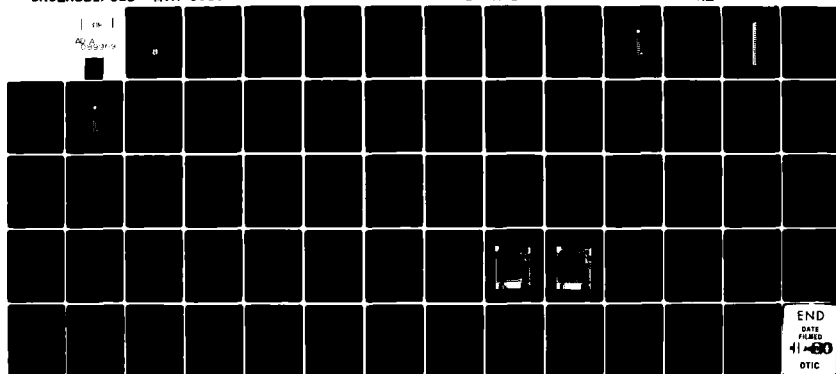
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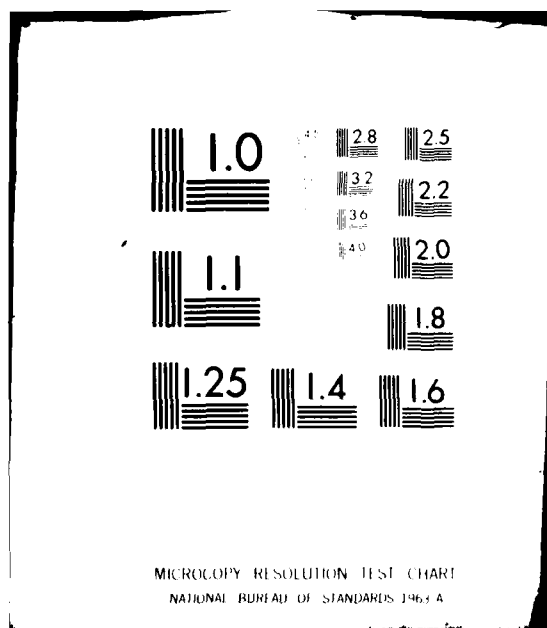
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DEB TYPE I ALARM STATUS UNIT
TECHNICAL MANUAL

BY DONALD E. PAULEY

AUGUST 1980

Prepared for

DEPUTY FOR COMMUNICATIONS AND INFORMATION SYSTEMS
ELECTRONIC SYSTEMS DIVISION
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
Hanscom Air Force Base, Massachusetts



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OCT 7 1980

Project No. 4920

Prepared by

THE MITRE CORPORATION
Bedford, Massachusetts

Contract No. F19628-80-C-0001

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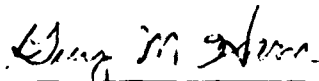
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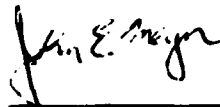
REVIEW AND APPROVAL

This technical report has been reviewed and is approved for publication.



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Project Engineer

FOR THE COMMANDER



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19. REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER ESD-TR-80-132	2. GOVT ACCESSION NO. AD-A089969	3. PERFORMER'S CATALOG NUMBER	
4. TITLE (and Subtitle) DEB TYPE I ALARM STATUS UNIT TECHNICAL MANUAL	5. TYPE OF REPORT & PERIOD COVERED		
7. AUTHOR(s) Donald E. Pauley	6. PERFORMING ORG. REPORT NUMBER MTR-3957		
	8. CONTRACT OR GRANT NUMBER(s) F19628-80-C-0001		
9. PERFORMING ORGANIZATION NAME AND ADDRESS The MITRE Corporation P. O. Box 208 Bedford, MA 01730 11 Aug		13. PROGRAM ELEMENT PROJECT, TASK AND WORK UNIT NUMBERS Project No. 4920	
11. CONTROLLING OFFICE NAME AND ADDRESS Deputy for Communications and Information Systems Electronic Systems Division, AFSC Hanscom AFB, MA 01731		12. REPORT DATE AUGUST 1980	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 12167		13. NUMBER OF PAGES 56	
		15. SECURITY CLASS. (of this report) UNCLASSIFIED	
		15a. DECLASSIFICATION DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) ALARM DISPLAY COMMUNICATIONS SITE RESTORAL DEB			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The DEB Type I Alarm Status Unit provides local display of the equipment alarms for the Type I Contingency Package. Visible and audible indication of new alarms are given. This document describes the theory, operation, and maintenance of this unit. An appendix contains information and drawings for construction of the Alarm Status Unit.			

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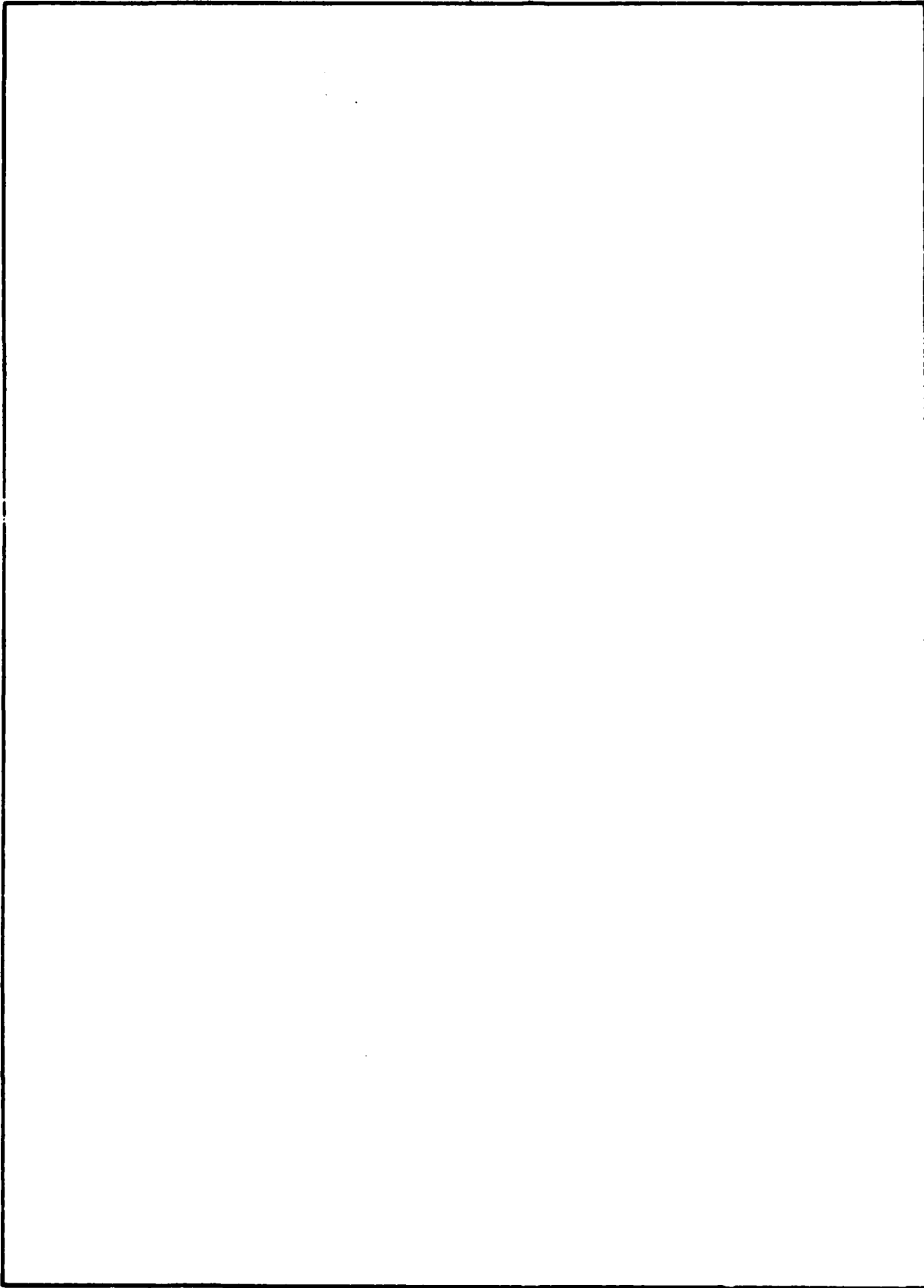
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ACKNOWLEDGMENTS

This report has been prepared by The MITRE Corporation under Project No. 4920. The contract is sponsored by the Electronic Systems Division, Air Force Systems Command, Hanscom Air Force Base, Massachusetts.

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1.0 GENERAL INFORMATION

1.1 Description and Purpose

The DEB Type I Shelter Alarm Status Unit monitors the communications hardware in the Type I Contingency Package and displays the alarm status of each piece of equipment. The occurrence of any alarm condition initiates an aural and visual alarm within the shelter and may initiate an external alarm. Manual acknowledgement silences the aural and external alarms. The visible indication remains until the equipment returns to normal operation.

The unit is designed for rack mounting. All connections are at terminal barrier strips on the rear of the unit. Figure 1.1 is a photograph of the Alarm Status Unit.

1.2 Specifications

The unit is intended to operate as a component of the DEB Type I Contingency Package. It monitors 16 contact closures of 11 pieces of equipment. Table 1.1 lists the specifications of the unit.

TABLE 1.1	
SPECIFICATIONS	
Power	115 VAC, 60 Hz
Input Signal	Contact Closure
Number of Inputs	16
Output Signal	115 VAC
Number of Outputs	1
Audible Alarm	2900 Hz at 70dBA, pulsing 0.5 to 1.5 pulses per second
Operating Temperature	-30°C to +45°C
Storage Temperature	-50°C to +65°C
Humidity	0 to 95%
Dimensions	
Width	19"
Height	3½"
Depth	11"
Weight	7 lb

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VIRRE

FIGURE 1.1. ALARM STATUS UNIT

2.0 INSTALLATION

2.1 Shipping and Storage

The Alarm Status Unit is designed for rack mounting within a transportable shelter. No special precautions are necessary for transportation after proper installation. If the unit is shipped by itself, normal packing and precautions for electronic equipment should be observed. The unit should not be exposed to environmental conditions beyond the limits in Table 1.1

2.2 Mechanical Installation

The unit is mounted in the Baseband rack between the T1 patch bay and the VF patch bay.

The mounting of the external alarm is not specified since a variety of alarm devices can be used.

2.3 Electrical Connections

All electrical connections to the Alarm Status Unit are at the terminal blocks located on the rear of the chassis. TB1 is used for input and output. Figure 2.1 is a photograph showing the connector.

2.3.1 Input

The inputs to the unit are received from the FAS Interface Terminal Strip Panel in the Baseband rack. Table 2.1 shows the inter-connection wiring between the FAS Terminal Strip and the Alarm Status unit (ASU) input Terminal Strip.

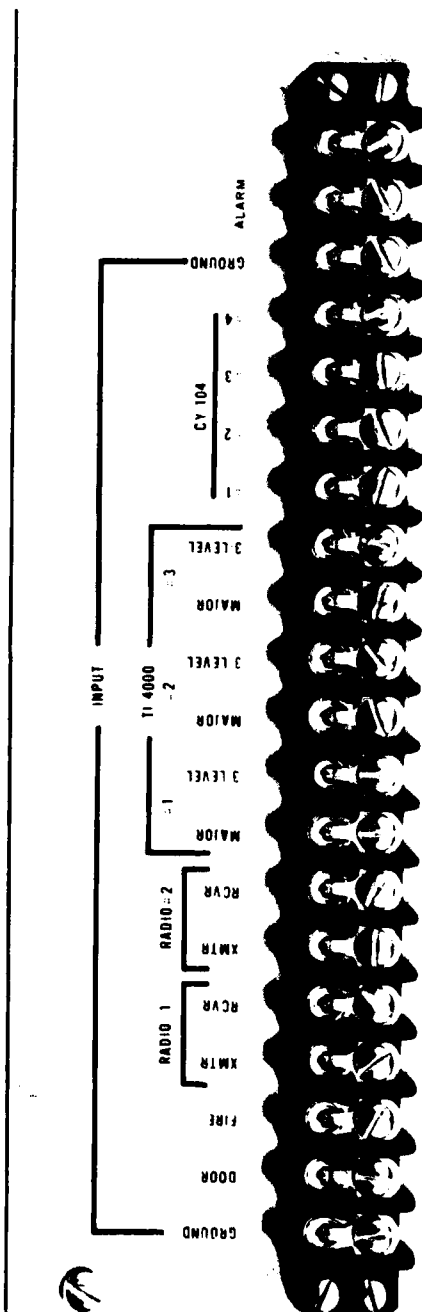


FIGURE 2.1. ELECTRICAL CONNECTIONS

TABLE 2.1		
INTERCONNECT WIRING		
Signal Name	ASU Terminal	FAS Terminal
Signal Ground	1	9
Door	2	8
Fire	3	10
XMTR #1	4	13
RCVR #1	5	14
XMTR #2	6	17
RCVR #2	7	18
T1-4000-#1 Major Error	8	20
T1-4000-#1 3-Level Error	9	21
T1-4000-#2 Major Error	10	23
T1-4000-#2 3-Level Error	11	24
T1-4000-#3 Major Error	12	26
T1-4000-#3 3-Level Error	13	27
CY-104 #1	14	29
CY-104 #2	15	30
CY-104 #3	16	31
CY-104 #4	17	32
Signal Ground	18	33
Alarm	19	
Alarm	20	

The Alarm Status Unit is connected to the FAS Terminal Strip using No. 22 or larger insulated wire for terminals 1 through 18. No. 18 or larger wire should be used from terminals 19 and 20 to the external alarm.

2.3.2 Output

The external alarm is connected to the ASU output Terminal Strip. The output supplies 115 volts AC during an alarm condition.

3.0 OPERATION

3.1 Controls and Indicators

All controls and indicators are located on the front panel. Table 3.1 lists the controls and their functions. The controls and indicators are shown on Figure 3.1.

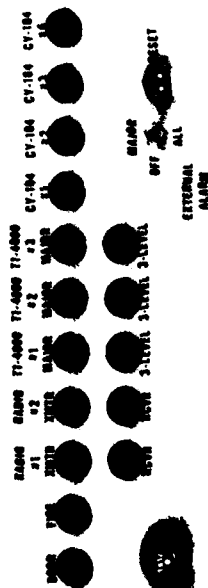
TABLE 3.1	
CONTROLS AND INDICATORS	
Control or Indicator	Function
RESET	Acknowledge new alarm condition.
EXTERNAL ALARM	Select the alarms that will cause an external alarm indication: OFF disables the external alarm. ALL permits any alarm to cause an external indication. MAJOR inhibits external indication of the door and T1-4000 3-level alarms.
SONALERT	Provides audible indication of all new alarm conditions.
Lights (16)	Provides visual indication of all alarm conditions. Blinking indicates a new alarm. Steady light indicates an acknowledged alarm.

3.2 Operating Instructions

3.2.1 Startup and Shutdown Procedure

After installation, the power and inputs are connected to the ASU. The ASU will be operational when the shelter power is on. Inactive equipment may indicate a new alarm condition at power up. RESET should be depressed to acknowledge this condition. Inactive equipment will normally indicate an acknowledged alarm condition.

DES TYPE 1
ALARM STATUS



NITRE

FIGURE 3.1. FRONT PANEL CONTROLS

3.2.2 New Alarms

A fault in the monitored equipment will initiate a new alarm condition. This is indicated by a flashing light (LED) showing the faulted equipment and an audible alarm. The new alarm condition persists until either the fault is cleared or the alarm is manually acknowledged.

3.2.3 Alarm Acknowledge

A new alarm condition is acknowledged by depressing the RESET button. This action will terminate the audible and external alarm indications, and change the blinking LED to steady ON. All new alarm indications are acknowledged simultaneously. The steady LED indication will persist until the equipment fault is cleared.

3.2.4 External Alarm

The external alarm may be triggered by a new alarm condition. The external alarm switch on the front panel selects the type of alarm condition that can cause an external alarm indication. The types are MAJOR, ALL (major and minor), and OFF (no external alarm). The MAJOR/MINOR designation of alarm inputs is shown in Table 4.1. If the new alarm condition is cleared or acknowledged within 8 seconds, the external alarm will not be initiated. The external alarm will be extinguished when the alarm condition is acknowledged or cleared.

4.0 THEORY OF OPERATION

4.1 Functional Operation

The function of the ASU is to monitor and display the operating status of the components of the DEB Type I Contingency Package. The logical elements of the unit are:

- o Alarm recognition logic
- o Visual display of status and alarm
- o Audible alarm indication
- o Power supply

The ASU can monitor up to 16 input signals. Each input is a contact closure. All contact closures, except DOOR, are normally open (NO) type and close in fault conditions. Table 4.1 lists the inputs monitored and the type of alarm. The DOOR and T1-4000 3-level error alarms are classified as MINOR. All other alarms are MAJOR alarms.

TABLE 4.1		
INPUT SIGNAL TYPES		
Input Signal	Contact Type	Class
DOOR	NC	MINOR
FIRE	NO	MAJOR
XMTR #1	NO	MAJOR
RCVR #1	NO	MAJOR
XMTR #2	NO	MAJOR
RCVR #2	NO	MAJOR
T1-4000 #1 Major Error	NO	MAJOR
T1-4000 #1 3-level Error	NO	MINOR
T1-4000 #2 Major Error	NO	MAJOR
T1-4000 #2 3-level Error	NO	MINOR
T1-4000 #3 Major Error	NO	MAJOR
T1-4000 #3 3-level Error	NO	MINOR
CY-104 #1	NO	MAJOR
CY-104 #2	NO	MAJOR
CY-104 #3	NO	MAJOR
CY-104 #4	NO	MAJOR

Figure 4.1 shows the logic diagrams and truth tables for the integrated circuits. The complete schematic of the ASU is shown on Appendix Figures A.2 and A.3. Simplified schematics of the functional elements are shown on Figures 4.2 through 4.4.

4.2 Alarm Recognition Logic

The alarm recognition logic detects transitions from normal to faulted operation; and provides outputs to the visual and audible indicator circuits. Figure 4.2 shows the schematic for alarm recognition. This circuit is replicated for each of the 16 inputs. The inverter, U0, is only used for an input with NO contacts (all except input #1, DOOR). The recognition logic consists of a D-type flip-flop and two gates.

An active alarm will present a high (H) level at the C1 input of U1. (For the NO inputs, U0 inverts the low (L) level to produce the H). C1 remains high as long as the equipment fault exists. The rising edge of this signal clocks the D input into the flip-flop and sets the Q output high. The Q output is the input signal to the audible alarm logic. The Q output and the C1 input drive the visual alarm logic.

U1 can be reset manually by a high level at the A input of U2. U1 will automatically be reset if C1 goes low. When U1 is set, the Q output is low. When both C1 and Q are low the output of NOR gate U3 goes high. This output is gated through U2 to reset flip-flop U1. Note that manually resetting U1 does not change the state of C1.

4.3 Visual Display

The visual display consists of a LED for each of the input lines. A blinking LED indicates a new alarm condition. A steady "ON" LED indicates an acknowledged alarm. Figure 4.3 shows the schematic of the visual display logic. Except for the oscillator (U4 & U5), the circuit is replicated for each of the 16 inputs.

The inputs to the visual display logic are the alarm input (C1 of U1) and Q output of U1. Blinking is generated by the one Hertz oscillator (U4 & U5). When a new alarm occurs C1 and Q are high. The high at Q gates the oscillator through U6 and the high at C1 gates this signal through U7 to the LED driver (U8). The alternating high/low condition at the output of U8 causes the LED to blink. Acknowledging the alarm resets U1 and returns Q to the low state. This forces the output of U6 high. With both inputs to U7 high, the output is low and LED is on steady. When the alarm condition clears, C1 (and the B input of U7) go low forcing the output high. This extinguishes the visual display.



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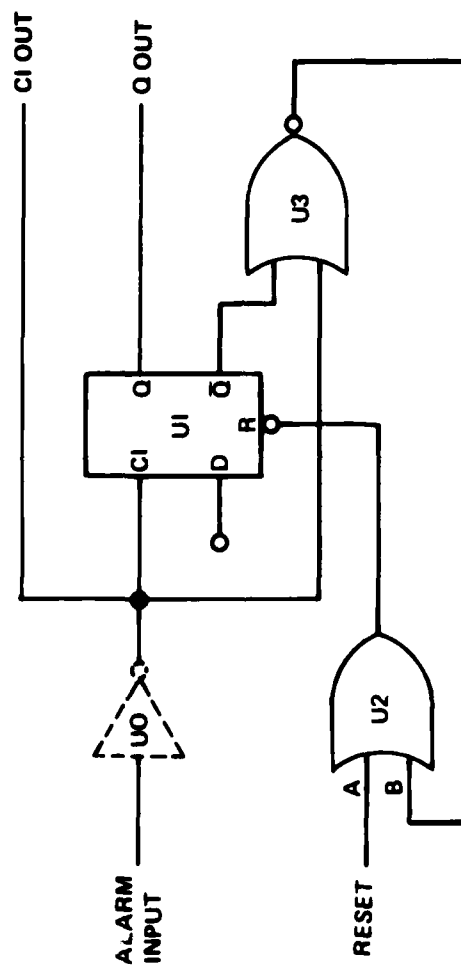


FIGURE 4.2. ALARM RECOGNITION LOGIC

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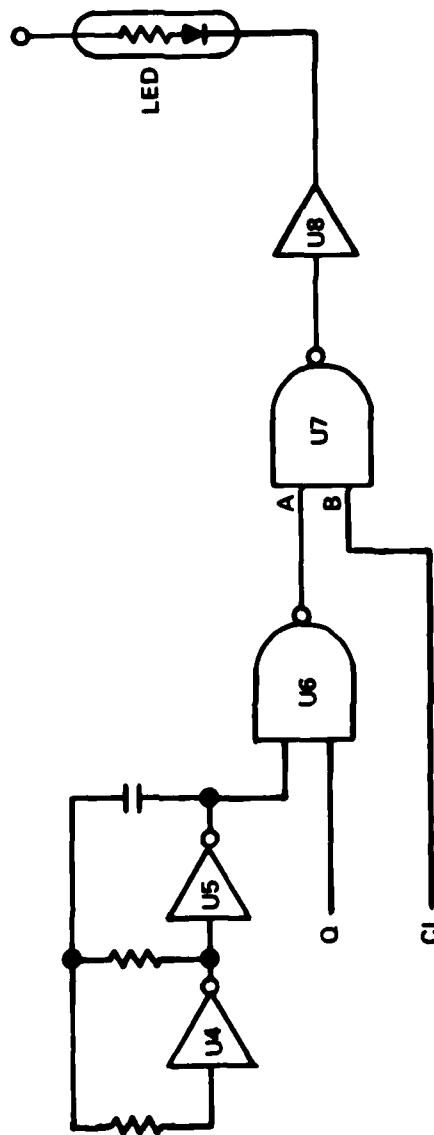


FIGURE 4.3. VISUAL DISPLAY LOGIC

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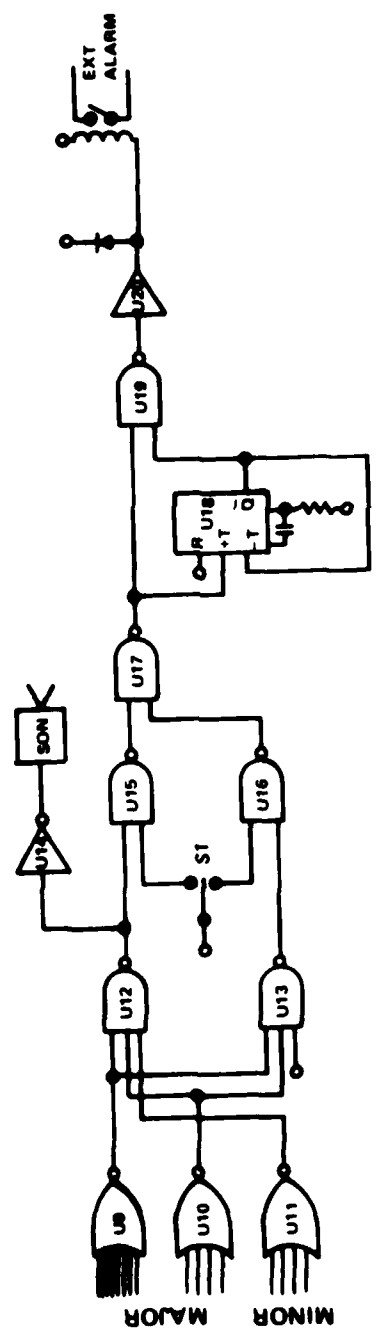


FIGURE 4.4. AUDIBLE ALARM LOGIC

4.4 Audible Alarm

A new alarm condition generates an audible alert at the front panel of the ASU. An external alarm will be generated if the alarm type (MAJOR or MINOR) matches the setting of switch S1. Figure 4.4 is a simplified schematic of the audible alarm logic.

The inputs to the audible alarm logic are the Q outputs of U1 for each input. If any Q is high the output of the associated NOR gate (U9, U10, or U11) is low. This low will cause the output of U12 to go high. If the input alarm was MAJOR, the output of U13 will also go high. U14 inverts the high at U12 to drive the front panel sonalert.

Switch S1 and gates U15, U16 select the type of alarms that can cause an external alarm. S1 may enable U15 (all alarms, U12), U16 (major alarms, U13), or neither (external alarm OFF). If either U15 or U16 is enabled and an alarm condition occurs (MAJOR only for U16) the output will go low, forcing the output of U17 high. A high output at U17 triggers one-shot U18 and enables gate U19. Triggering U18 produces a low pulse at the \bar{Q} output for about 8 seconds. If U19 is enabled (U17 high) when \bar{Q} goes high, the output goes low. U20 drives the relay to provide an external alarm signal. The diode damps the switching transients. The relay contacts are NO and supply 115 volts on closure.

4.5 Power Supply

The ASU operates from a 115 VAC, 60 Hz, modular power supply. The power supply furnishes +15 VDC to operate the logic circuitry.

5.0 MAINTENANCE

This section contains information necessary to maintain the ASU. Field maintenance is limited to replacing the electronic circuit board or replacing the entire ASU. All other maintenance must be performed at the depot level. The test equipment needed for maintenance is shown in Table 5.1.

TABLE 5.1	
MAINTENANCE EQUIPMENT REQUIRED	
Equipment Identification	Specifications
Multimeter	Measures voltage, current, resistance. 0-5000 VAC or VDC 0-10 amperes 0-20 megohms
Extender card, Augat RG86	--

A complete schematic is shown on Appendix Figures A.2 and A.3. For discussion, the partial schematics of Section 4 will be used. Table 5.2 shows the correspondence of the simplified schematics to the full schematic for each input. Table 5.3 is a set of diagnostic tests with the probable component failure associated with each test.

TABLE 5.2
CORRESPONDENCE BETWEEN PARTIAL AND COMPLETE SCHEMATICS

Alarm	Inverter U0-out	Flip-Flop U1 CL Q	Reset U2-out	U3-out	Visual Display U6-out	U7-out	U8-out	Audible input U9, U10, U11
Door	-	1-3	1-2	21-3	17-3	9-3	32-4	26-2
Fire	30-6	1-11	1-11	21-4	17-4	9-4	32-6	25-2
XMTR #1	30-10	2-3	2-2	21-10	17-10	10-3	32-10	25-3
RCVR #1	30-12	2-11	2-11	21-11	17-11	10-4	32-12	25-4
XMTR #2	30-15	3-3	3-2	22-3	18-3	11-3	32-15	25-5
RCVR #2	31-2	3-11	3-11	22-4	18-4	11-4	33-2	25-9
T1-4000 #1 Major	31-4	4-3	4-2	22-10	18-10	12-3	33-4	25-10
T1-4000 #1 3-level	31-6	4-11	4-11	22-11	18-11	12-4	33-6	26-3
T1-4000 #2 Major	31-10	5-3	5-2	23-3	19-3	13-3	33-10	25-11
T1-4000 #2 3-level	31-15	5-11	5-11	23-4	19-4	13-4	33-12	26-4
T1-4000 #3 Major	35-2	6-3	6-2	23-10	19-10	14-3	33-15	25-12
T1-4000 #3 3-level	35-4	6-11	6-11	23-11	19-11	14-4	34-2	26-5
CY-104 #1	35-6	7-3	7-2	24-3	20-3	15-3	34-4	26-9
CY-104 #2	35-10	7-11	7-11	24-4	20-4	15-4	34-6	26-10
CY-104 #3	35-12	8-3	8-2	24-10	20-10	16-3	34-10	26-11
CY-104 #4	35-15	8-11	8-11	24-11	20-11	16-4	34-12	26-12

Entries are given as IC Number - Pin Number - e.g. 7-13 is IC7 Pin 13

TABLE 5.3		
DIAGNOSTIC TESTS		
Symptom	Test Condition	Probable Failure
Unit Completely dead	1. No AC voltage at power supply input 2. No DC voltage at power supply output	Fuse blown Defective power supply
(This test references voltage to chassis ground)		
Unit blows fuses	-	Power supply
No response to alarm input	1. C1 input of U1 remains low	a. Cabinet wiring defective b. U0 defective
Visible display does not blink, audible alarm on	1. U5 output constant high or low 2. U6 output constant high or low	U4 or U5 U6
Visible display on steady, audible alarm off	1. Reset of U1 high 2. Q of U1 low	U2, U3 or Reset switch U1
No visible display	1. Output of U8 high 2. Output of U8 low	U7 or U8 LED
Visible display normal, no audible alarm	1. Output of U9, U10, U11 all high 2. Output of U12 low 3. Output of U14 high 4. Output of U14 low	U9 (major alarm except CY-104) U10 (CY-104) U11 (minor alarm) U12 U14 Sonalert

TABLE 5.3 (Continued)		
DIAGNOSTIC TESTS		
Symptom	Test Condition	Probable Failure
No external alarm	<ol style="list-style-type: none"> 1. Switch inputs to U15 and U16 both low 2. Output of U15 (all alarms) and U16 (major alarms) both high 3. Output of U17 high 4. \bar{Q} of U18 remains low for longer than 10 seconds 5. Output of U20 high 6. Output of U20 low 	<p>Switch</p> <p>U15 or U16 (or U13 major only)</p> <p>U17</p> <p>U18 or RC timing components</p> <p>U19 or U20 relay</p>
External alarm does not delay 6 to 10 seconds	-	U18 or RC timing components

APPENDIX

This appendix contains drawings and parts lists necessary for the construction of the DEB Type I Shelter Alarm Status Unit. The parts referenced are those used in the design verification units fabricated by The MITRE Corporation.

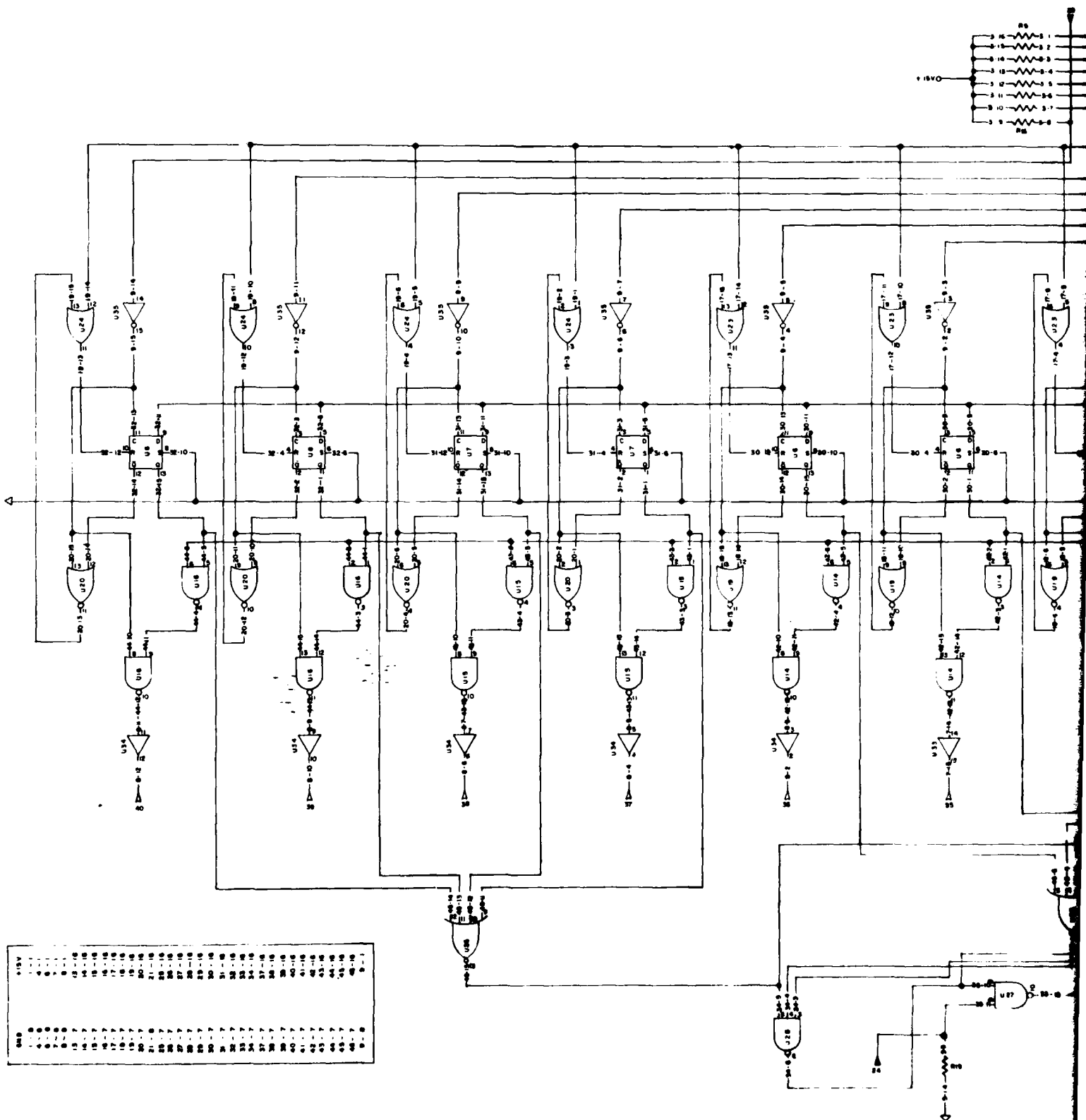
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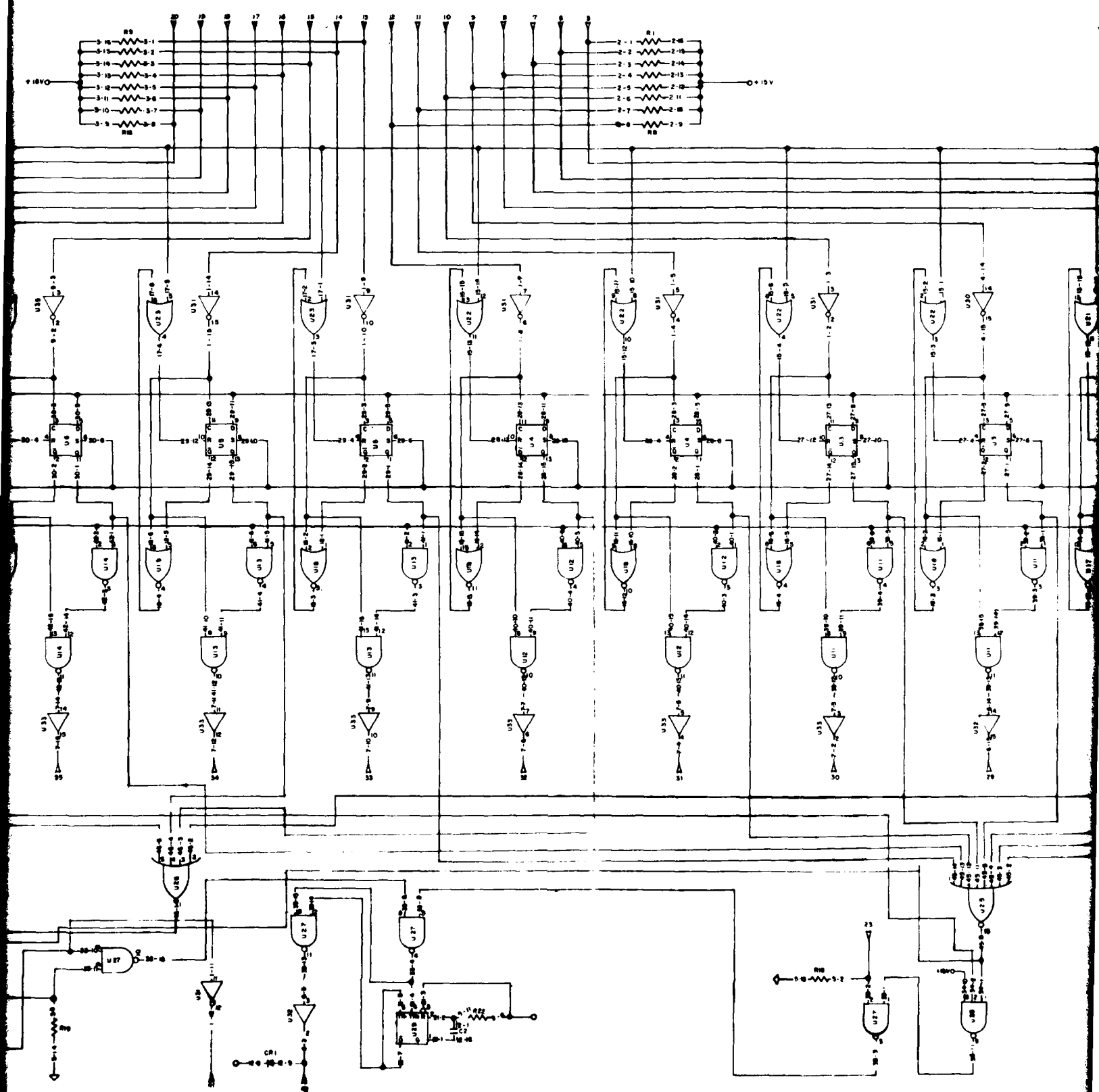
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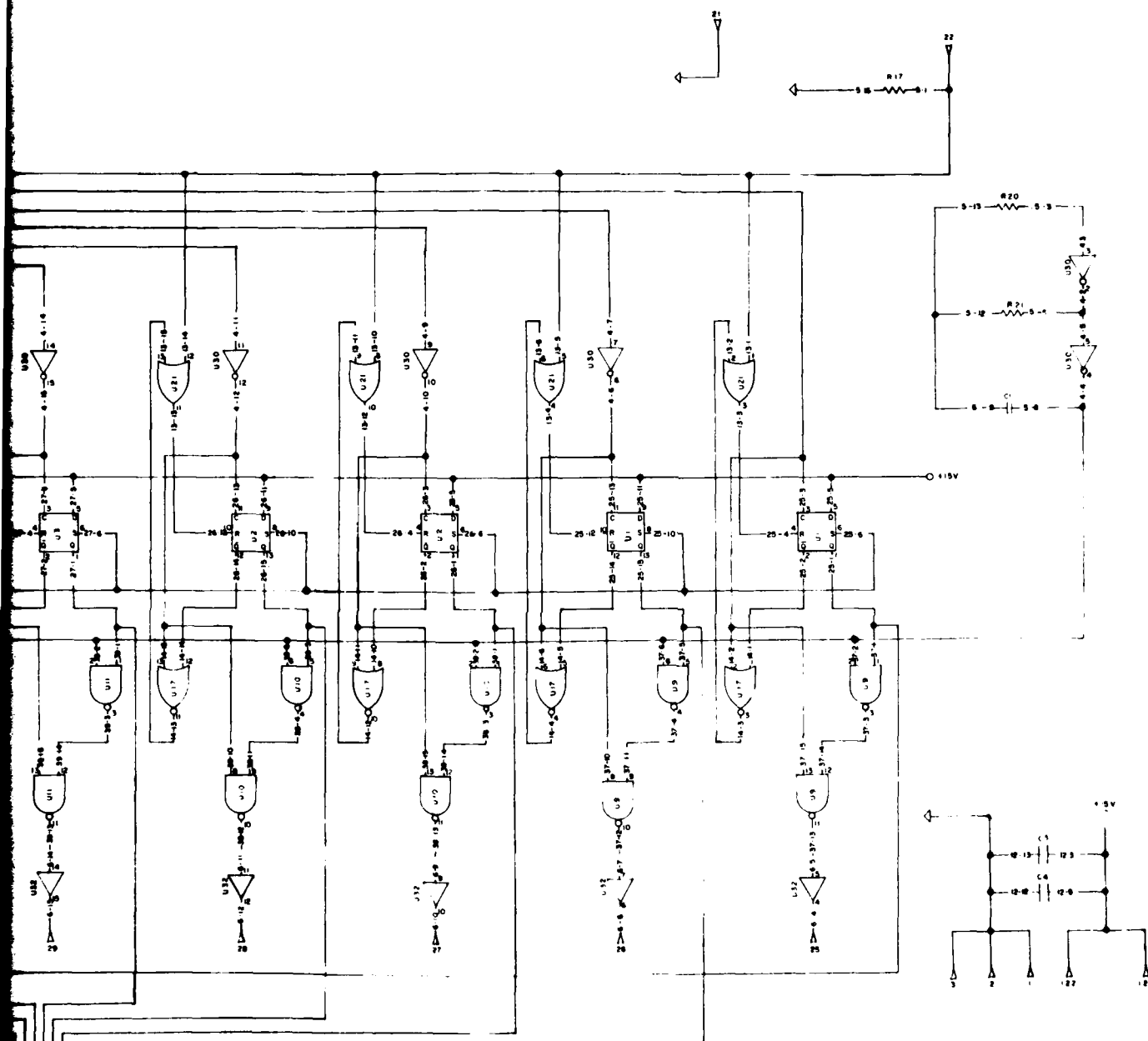
TABLE A.1				
PARTS LIST				
REFERENCE DESIGNATION	DESCRIPTION	PART NO.	MANUFACTURER	
IC1, IC2, IC3, IC4, IC5, IC6, IC7, IC8	dual D flip-flop	CD4013BE	RCA	
IC9, IC10, IC11, IC12, IC13, IC14, IC15, IC16, IC27, IC28	quad NAND	CD4011BE	RCA	
IC17, IC18, IC19, IC20	quad NOR	CD4001BE	RCA	
IC21, IC22, IC23, IC24	quad OR	CD4071BE	RCA	
IC25	8-NOR	CD4078BE	RCA	
IC26	dual 4-NOR	CD4002BE	RCA	
IC29	dual one-shot	CD4098BE	RCA	
IC30, IC31, IC35	hex inverter	CD4049BE	RCA	
IC32, IC33, IC34	hex buffer	CD4050BE	RCA	
CR1	diode	1N4005	Motorola	
R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19	resistor, 24K, 1/8W	Type BB-5	Allen-Bradley	
R20	resistor 30K, 1/8W	Type BB-5	Allen-Bradley	
R21	resistor 300K, 1/8W	Type BB-5	Allen-Bradley	
R22	resistor 1.6M, 1/8W	Type BB-5	Allen-Bradley	

TABLE A.1 Cont.			
PARTS LIST			
REFERENCE DESIGNATION	DESCRIPTION	PART NO.	MANUFACTURER
C1, C2, C3	capacitor 10 μ F	196D	Sprague
C4	capacitor 0.1 μ F	8121-050-691-104M	Erie
I1, I2, I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14, I15, I16	LED Assembly	249-7871-3331-504	Dialight
K1	Relay	TS154-2C-4.1ma DC	Allied Control
L1	Sonalert	SC616J	Mallory
F1	Fuse	3AG, 2 amp	Littelfuse
-	Fuseholder	342012	Littelfuse
S1	Switch SDDT CENT/OFF	JMT121	J-B-T
S2	Switch PB	MSP-205R	Alco
-	Red Cap for S2	ALC-C-12 RED	Alco
TB1	Terminal Strip (20 point)	353-18-20-001	TRW Cinch
-	AC Cable	SVT 17237S	Belden
P1	Connector	14005-1P1	Augat
-	Wirewrap board	8136-RG4	Augat
-	Component board (Qty 4)	616CG1	Augat
-	Power supply +15 VDC	HE384	Computer Products

TABLE A.1 Cont.			
PARTS LIST			
REFERENCE DESIGNATION	DESCRIPTION	PART NO.	MANUFACTURER
	Front Panel	DWG D-000648-4	
	Chassis	DWG D-000648-5	
	Card Guide Bracket	DWG C-000648-3	
	Screw, BD. HD. 4-40 x .62L	ST. STL. (Qty 8)	
	Screw, BD. HD. 6-32 x .50L	ST. STL. (Qty 4)	
	Screw, BD. HD. 6-32 x .75L	ST. STL. (Qty 2)	
	Nut, Hex 3-56		
	Nut, Hex, Stop 4-40 (Qty 8)		
	Nut, Hex, Stop 6-32 (Qty 12)		
	Washer, Lock #3		
	Bushing, Strain Relief		
	Name Plate	DWG B-000648-16	







INPUTS TO ALL UNUSED GATES SHALL BE GROUNDED
NOTES

FIGURE A.2. SCHEMATIC DIAGRAM

TTL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</
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DATE	10/10/77	BY	W. J. BAKER
REVISION	1	DESCRIPTION	TYPE I SMELTER ALARM SCHEMATIC DIAGRAM
PROJECT	4820 01003	REV	000 648 - 4
APP. SKETCH		DATE	10/10/77

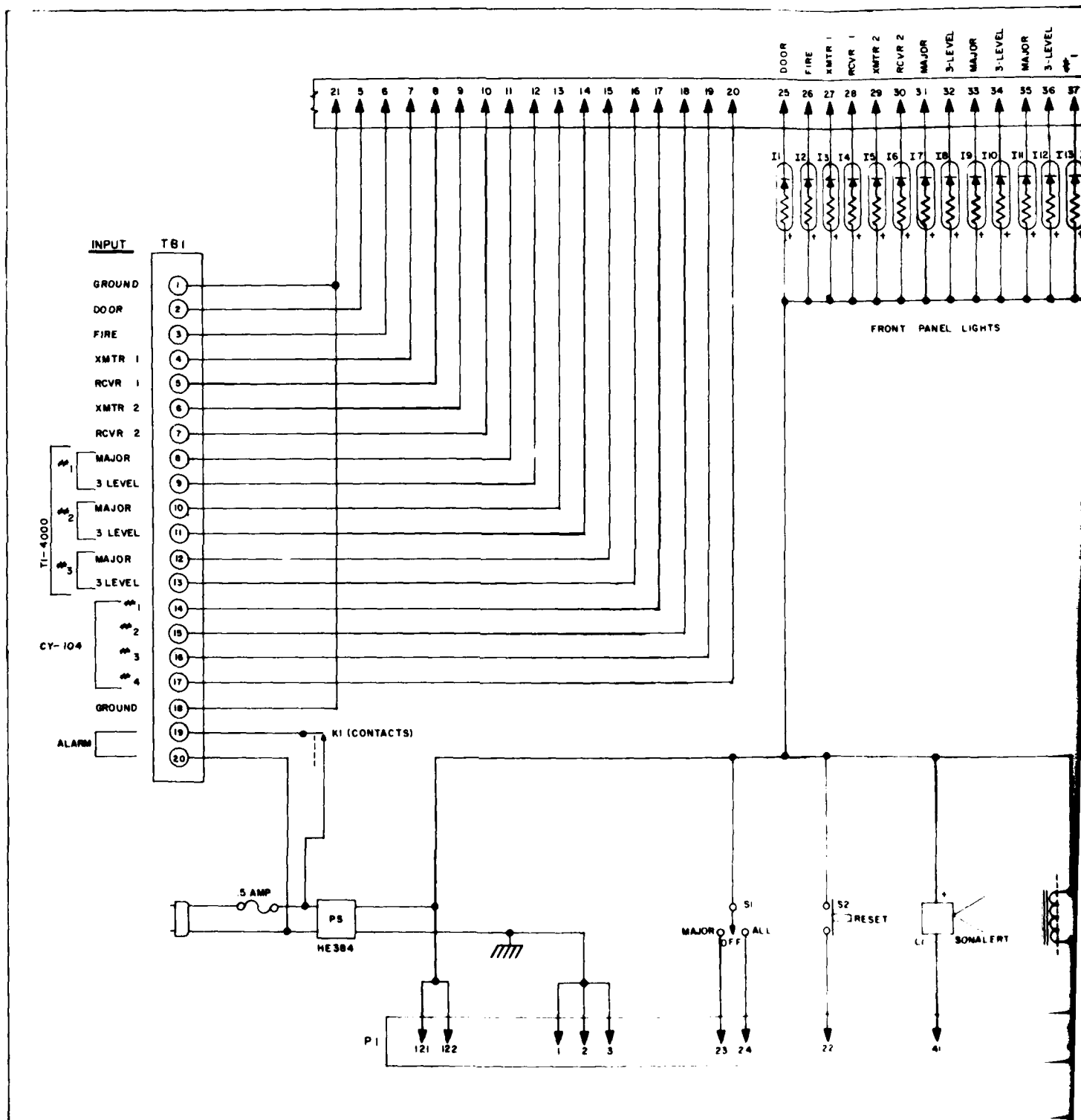
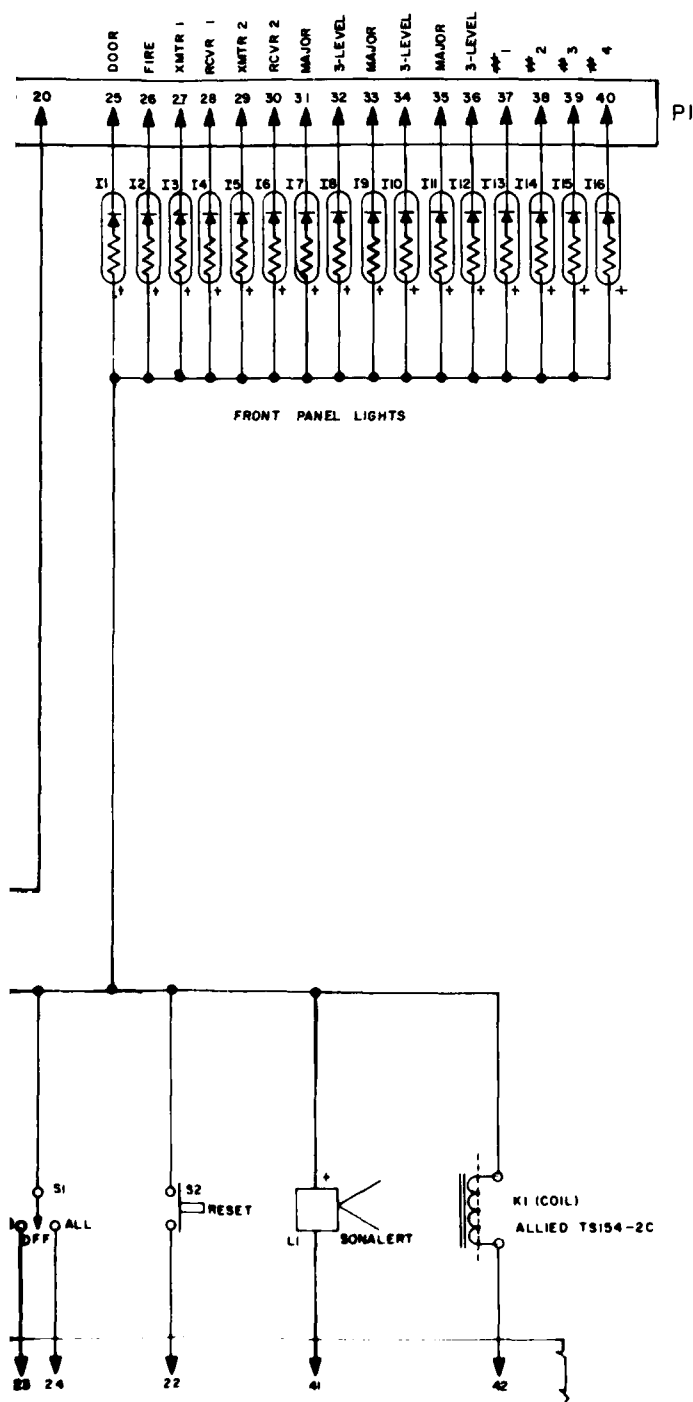


FIGURE A.3. TYPE 1 SHELTER ALARM CHASSIS



GROUP	FIND NO	QTY REQ	DESCRIPTION	PART NO	MATERIAL
4	3	8	1		
DRAFTER B BROWN 2/1/74			MITRE NE DORF MASSACHUSETTS		
CHECKER J H WILSON 2/1/74			TITLE TYPE I SHELTER ALARM CHASSIS WIRING		
ENGINEER RELEASE 4920 930103 CODE IDENT NUMBER			SIZE D 000648-13		
DETY ASSEMBLY			DO NOT SCALE SCALE SHEET		

TABLE A.4
WIREWRAP BOARD WIRE RUNNING SHEET
ALARM STATUS UNIT
Wire Function: Ground

<u>Run</u>	<u>Connections*</u>
1	1-8; 13-GD
2	4-8; 16-GD
3	5-14; 5-15; 5-16; 4-GD
4	6-8; 18-GD
5	7-8; 19-GD
6	8-8; 8-14; 9-GD
7	9-8; 20-GD
8	12-12; 12-14; 12-GD
9	13-7; 25-GD
10	14-7; 26-GD
11	15-7; 27-GD
12	16-7; 28-GD
13	17-7; 29-GD
14	18-7; 30-GD
15	19-7; 31-GD
16	20-7; 32-GD
17	21-8; 21-12; 21-13; 33-GD
18	25-7; 25-6; 25-10; 37-GD
19	26-7; 26-6; 26-10; 38-GD
20	27-7; 27-6; 27-10; 39-GD

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections *</u>
21	28-7; 28-6; 28-10; 40-GD
22	29-7; 29-6; 29-10; 41-GD
23	30-7; 30-6; 30-10; 42-GD
24	31-7; 31-6; 31-10; 43-GD
25	32-7; 32-6; 32-10; 44-GD
26	33-7; 45-GD
27	34-7; 34-14; 34-15; 34-GD; 34-13
28	37-7; 49-GD
29	38-7; 50-GD
30	39-7; 51-GD
31	40-7; 52-GD
32	41-7; 53-GD
33	42-7; 54-GD
34	43-7; 55-GD
35	44-7; 56-GD
36	45-7; 57-GD
37	46-7; 58-GD
38	EC21; GD

TABLE A.4 (Continued)
WIREWRAP BOARD WIRE RUNNING SHEET
ALARM STATUS UNIT

Wire Function: +15V

<u>Run</u>	<u>Connections*</u>
1	1-1; 1-VC
2	2-9; 2-10; 2-11; 2-12; 2-13; 2-14; 2-15; 2-16; 2-VC
3	3-9; 3-10; 3-11; 3-12; 3-13; 13-14; 3-15; 3-16; 3-VC
4	4-1; 4-VC
5	5-6; 17-VC
6	6-1; 6-VC
7	7-1; 7-VC
8	8-1; 8-VC
9	9-1; 9-VC
10	12-8; 12-3; 12-5; 24-VC
11	13-16; 13-VC
12	14-16; 14-VC
13	15-16; 15-VC
14	16-16; 16-VC
15	17-16; 17-VC
16	18-16; 18-VC
17	19-16; 19-VC
18	20-16; 20-VC
19	21-16; 21-11; 33-VC; 21-3
20	25-5; 25-11 25-16; 25-VC

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections *</u>
21	26-5; 26-11; 26-16; 26-VC
22	27-5; 27-11; 27-16; 27-VC
23	28-5; 28-11; 28-16; 28-VC
24	20-5; 29-11; 29-16; 29-VC
25	30-5; 30-11; 30-16; 30-VC
26	31-5; 31-11; 31-16; 31-VC
27	32-5; 32-11; 32-16; 32-VC
28	33-16; 33-VC
29	34-16; 34-VC; 34-10
30	37-16; 37-VC
31	38-16; 38-VC
32	39-16; 39-VC
33	40-16; 40-VC
34	41-16; 41-VC
35	42-16; 42-VC
36	43-16; 43-VC
37	44-16; 44-VC
38	45-16; 45-VC
39	46-16; 46-VC

TABLE A.4 (Continued)

WIREWRAP BOARD WIRE RUNNING SHEET

ALARM STATUS UNIT

Wire Function: Signal

<u>Run</u>	<u>Connections*</u>
1	EC14; 3-2; 1-14
2	1-15; 18-6; 29-13; 41-10
3	EC15; 3-3; 9-3
4	9-2; 18-11; 30-3; 42-15
5	EC16; 3-4; 9-5
6	9-4; 18-15; 30-13; 42-10
7	1-11; 34-6; 33-10
8	EC41; 1-12
9	EC5; 2-1; 14-2; 25-3; 37-15
10	EC6; 2-2; 4-7
11	4-6; 14-6; 25-13; 37-10
12	EC7; 2-3; 4-9
13	4-10; 14-11; 26-3; 38-15
14	EC8; 2-4; 4-11
15	4-12; 14-15; 26-13; 38-10
16	EC9; 2-15; 4-14
17	4-15; 16-2; 27-3; 39-15
18	EC10; 2-6; 1-3
19	1-2; 16-6; 27-13; 39-10
20	EC11; 2-7; 1-5

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections*</u>
21	1-4; 16-11; 28-3; 40-15
22	EC12; 2-8; 1-7
23	1-6; 16-15; 28-13; 40-10
24	EC13; 3-1; 1-9
25	1-10; 18-2; 29-3; 41-15
26	EC17; 3-5; 9-7
27	9-6; 20-2; 31-3; 43-15
28	EC18; 3-6; 9-9
29	9-10; 20-6; 31-13; 43-10
30	EC19; 3-7; 9-11
31	9-12; 20-11; 32-3; 44-15
32	EC20; 3-8; 9-14
33	9-15; 20-15; 32-13; 44-10
34	4-2; 4-5; 5-5
35	4-3; 5-4
36	4-4; 5-8; 37-2; 37-6; 38-2; 38-6; 39-2; 39-6; 40-2; 40-6; 41-2; 41-6; 42-2; 42-6; 43-2; 43-6; 44-2; 44-6
37	EC22; 5-1; 13-1; 13-5; 13-10; 13-14; 15-1; 15-5; 15-10; 15-14; 17-1; 17-5; 17-10; 17-14; 19-1; 19-5; 19-10; 19-14
38	EC23; 5-2; 33-2
39	EC24; 5-3; 33-11
40	5-9; 5-12; 5-13

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections*</u>
41	5-11; 12-1; 21-2
42	EC42; 6-2; 12-9
43	6-3; 33-13
44	EC25; 6-4
45	6-5; 27-13
46	EC26; 6-6
47	6-7; 37-12
48	6-9; 38-13
49	EC27; 6-10
50	6-11; 38-12
51	EC28; 6-12
52	6-14; 39-13
53	EC29; 6-15
54	EC30; 7-2
55	7-3; 39-12
56	EC31; 7-4
57	7-5; 40-13
58	EC32; 7-6
59	7-7; 40-12
60	7-9; 41-13
61	EC33; 7-10
62	7-11; 41-12
63	EC34; 7-12
64	7-14; 42-13

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections *</u>
65	EC35; 7-15
66	EC36; 8-2
67	8-3; 42-12
68	EC37; 8-4
69	8-5; 43-13
70	EC38; 8-6
71	8-7; 43-12
72	8-9; 44-13
73	EC39; 8-10
74	EC40; 8-12
75	8-11; 44-12
76	12-16; 21-1
77	13-2; 14-3
78	13-3; 25-4
79	13-6; 14-4
80	13-4; 25-12
81	13-11; 14-12
82	13-12; 26-4
83	13-15; 14-13
84	13-13; 26-12
85	15-2; 16-3
86	15-3; 27-4
87	15-4; 27-12
88	15-6; 16-4

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections*</u>
89	15-11; 16-12
90	15-12; 28-4
91	15-13; 28-12
92	15-15; 16-13
93	17-2; 18-3
94	17-3; 29-4
95	17-4; 29-12
96	17-6; 18-4
97	17-11; 18-12
98	17-12; 30-4
99	17-15; 18-13
100	19-2; 20-3
101	19-3; 31-4
102	19-4; 31-12
103	19-6; 20-4
104	19-11; 20-12
105	19-12; 32-4
106	19-13; 32-12
107	19-15; 20-13
108	14-1; 25-2
109	14-5; 25-14
110	14-10; 26-2
111	17-13; 30-12

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections*</u>
112	14-14; 26-14
113	16-1; 27-2
114	16-5; 27-14
115	16-10; 28-2
116	16-14; 28-14
117	18-1; 29-2
118	18-5; 29-14
119	18-10; 30-2
120	18-14; 30-14
121	20-1; 31-2
122	20-5; 31-14
123	20-10; 32-2
124	20-14; 32-14
125	21-4; 33-4; 33-15
126	21-5; 21-7; 33-14
127	25-1; 37-1; 46-2
128	25-15; 37-5; 45-2
129	26-1; 38-1; 45-3
130	26-15; 38-5; 45-4
131	27-1; 39-1; 45-5
132	27-15; 39-5; 45-11
133	28-1; 40-1; 45-12
134	28-15; 40-5; 46-3

TABLE A.4 (Continued)

<u>Run</u>	<u>Connections*</u>
135	29-1; 41-1; 45-13
136	29-15; 41-5; 46-4
137	30-1; 42-1; 45-14
138	30-15; 42-5; 46-5
139	31-1; 43-1; 46-11
140	31-15; 43-5; 46-12
141	32-1; 44-1; 46-13
142	32-15; 44-5; 46-14
143	33-3; 33-5
144	33-6; 33-12
145	37-3; 37-14
146	37-4; 37-11
147	33-1; 34-11
148	34-1; 45-15; 34-3
149	34-2; 34-5; 46-15
150	34-4; 46-1
151	38-3; 38-14
152	38-4; 38-11
153	39-3; 39-14
154	39-4; 39-11
155	40-3; 40-14
156	40-4; 40-11
157	41-3; 41-14

TABLE A.4 (Concluded)

<u>Run</u>	<u>Connections *</u>
158	41-4; 41-11
159	42-3; 42-14
160	42-4; 42-11
161	43-3; 43-14
162	43-4; 43-11
163	44-3; 44-14
164	44-4; 44-11

*All wirewrap board points listed for a run are connected together. Points are designated by socket number and pin number. For example, 9-11 is pin 11 of socket 9. GD is ground and VC is +15 VDC. EC10 is edge connector pin 10.

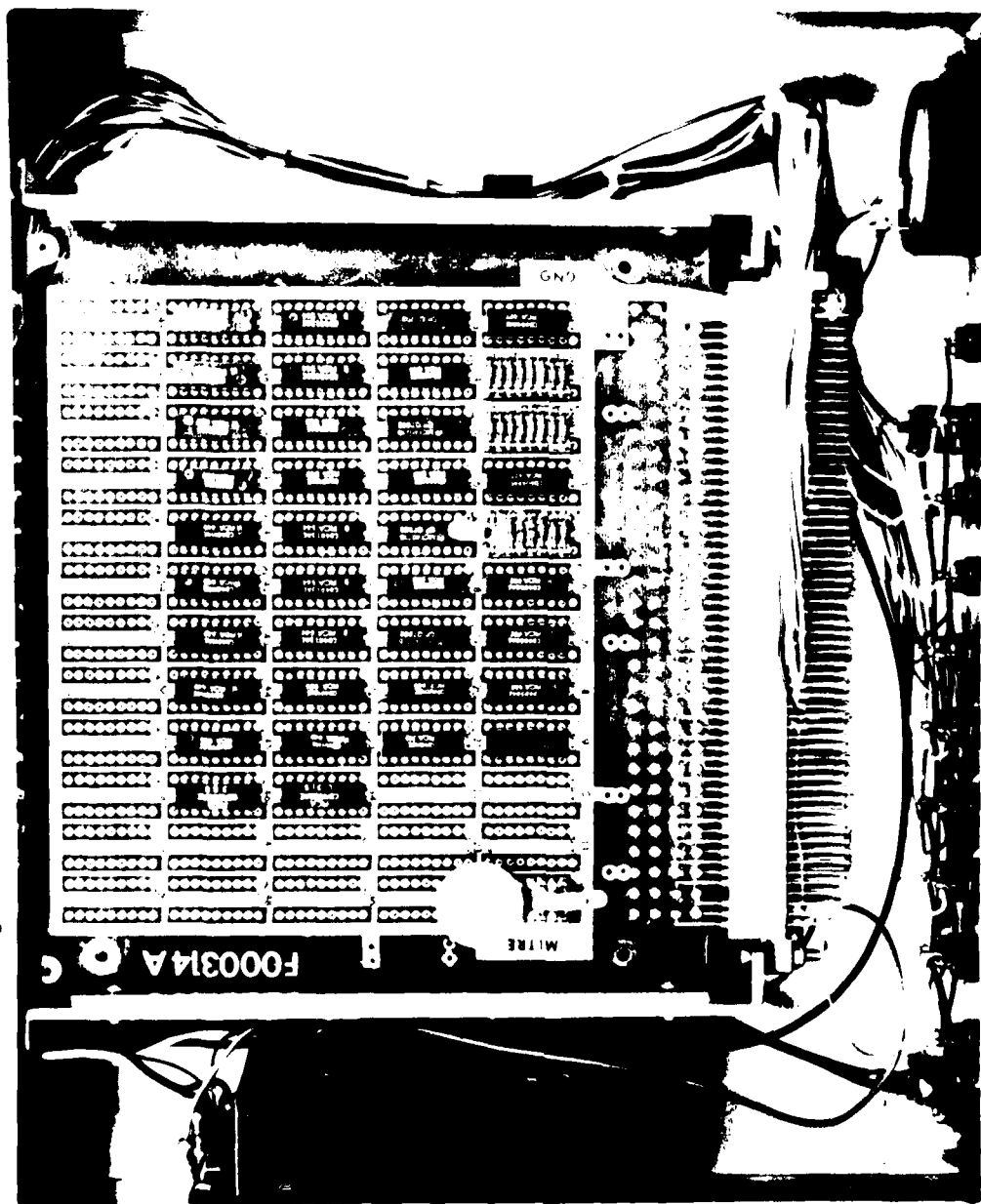


FIGURE A.5. ASU INTERIOR

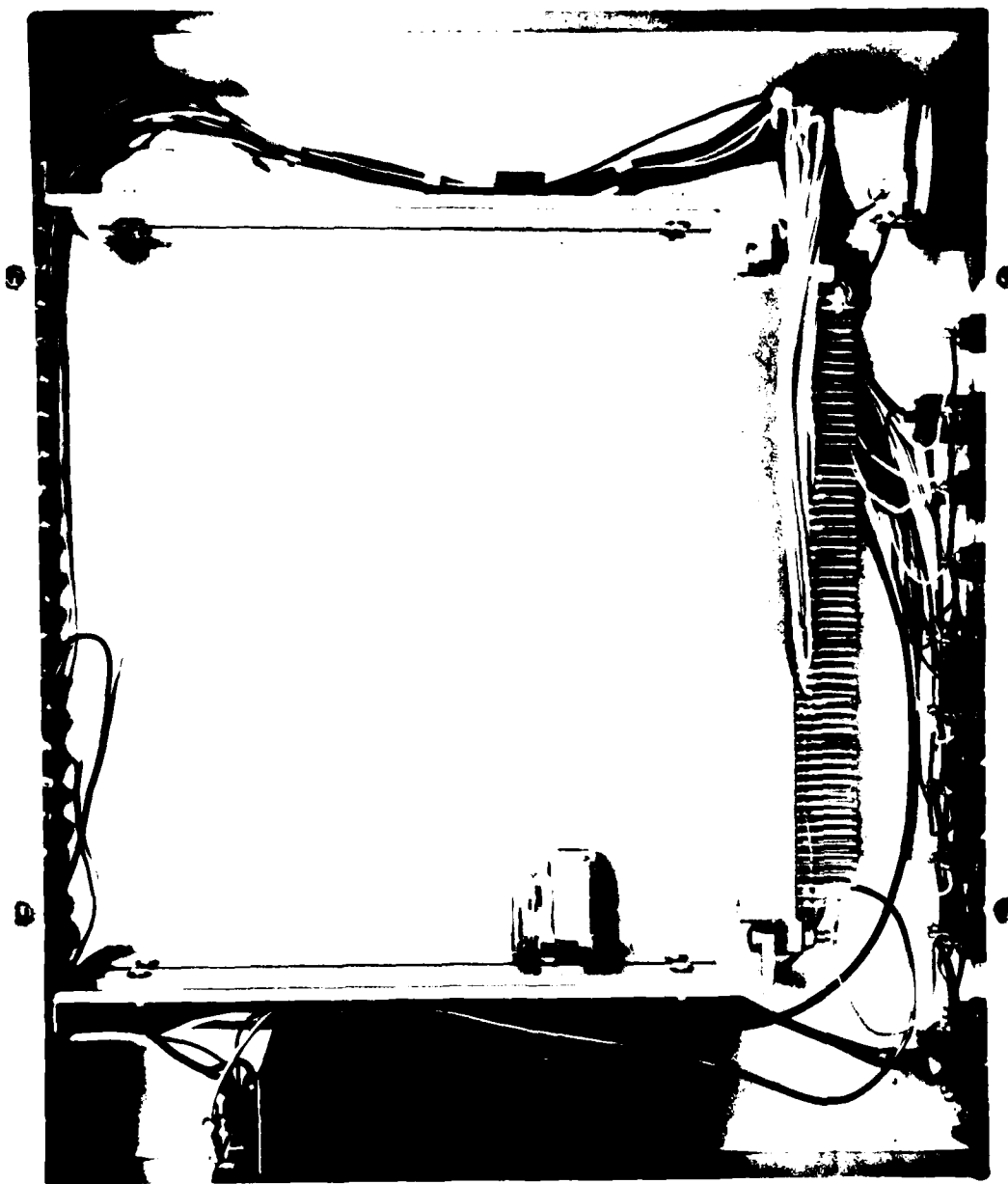


FIGURE A.6. ASU INTERIOR (without circuit card)

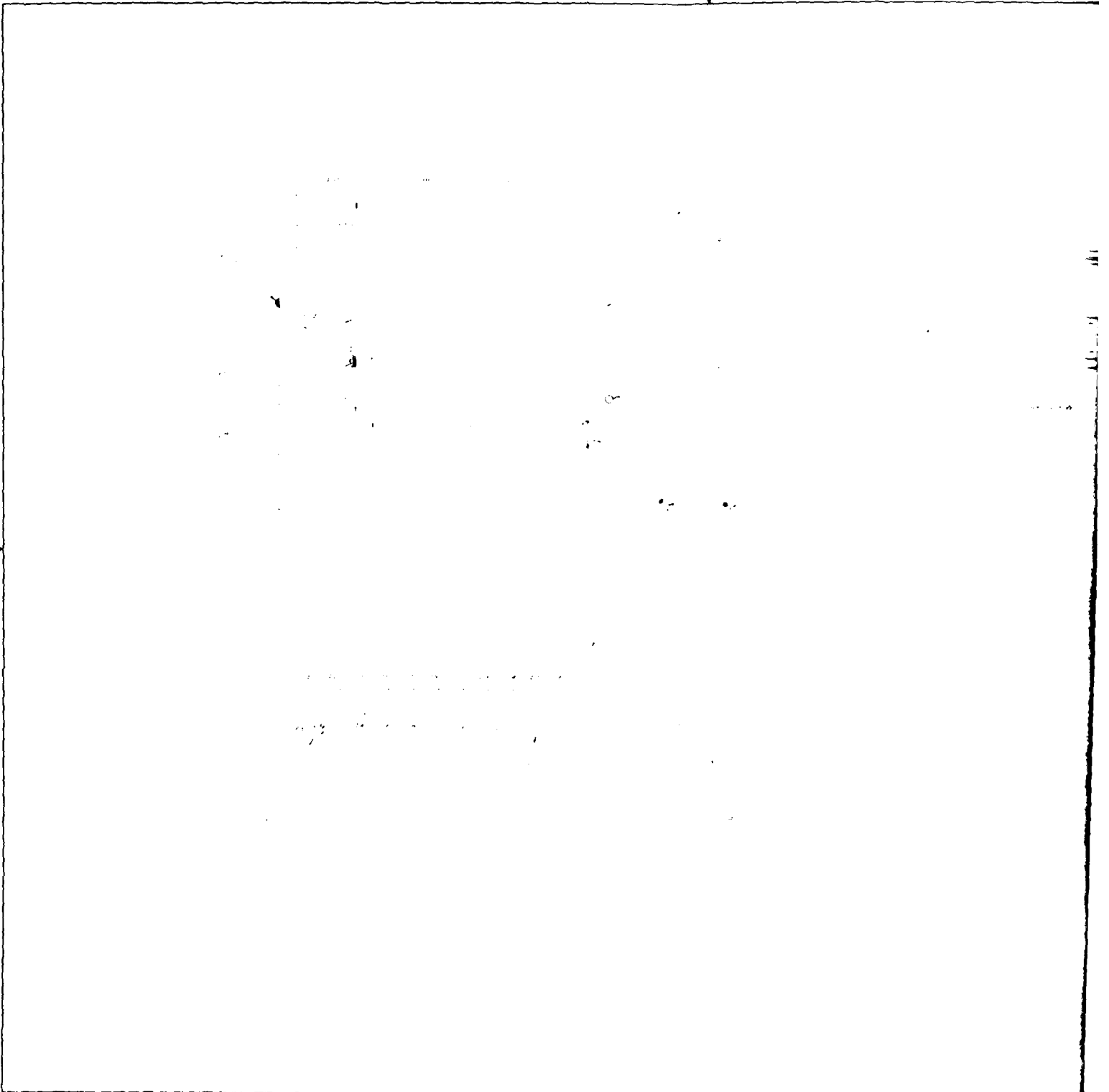
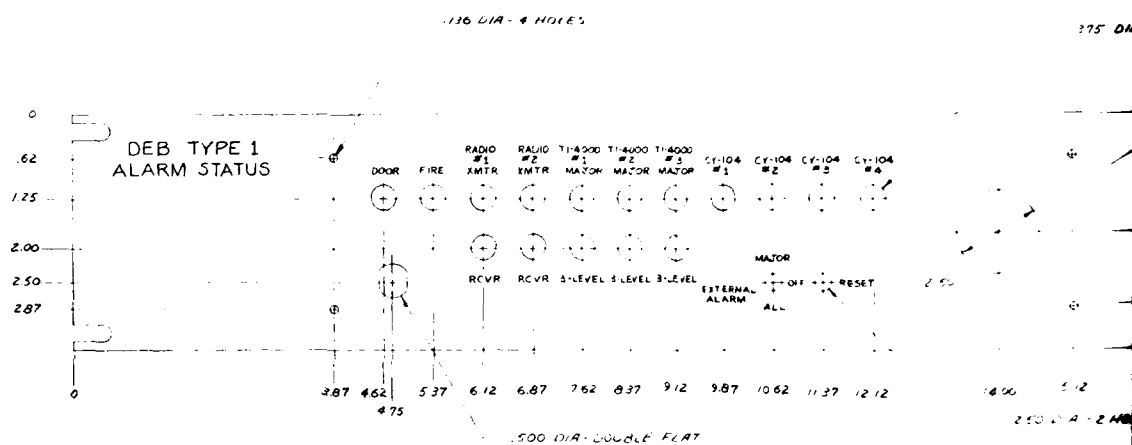
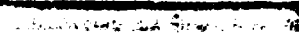


FIGURE A.7. SHELTER ALARM ASSEMBLY

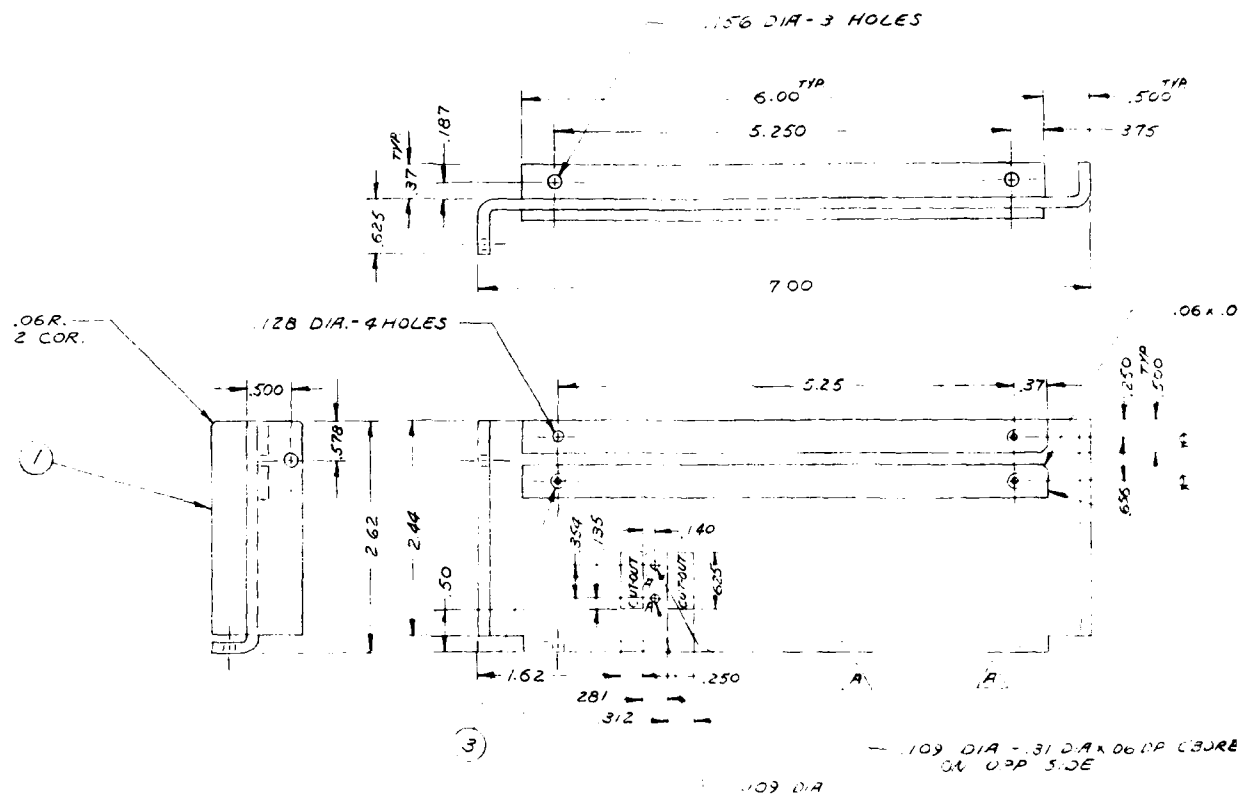


3 SILK SCREEN MARKINGS BLACK & AS SHOWN
 2 FINISH PAINT SIDA RIVIERA GREY EPOXY
 INSTALL STUDS UNDER PANEL IS USED TO LOCATE MOUNTING
 HOLES IN CHASSIS SEE DWG D-000688-1
 NOTES:

FIGURE A.7.1. PANEL, SHELTER ALARM



1



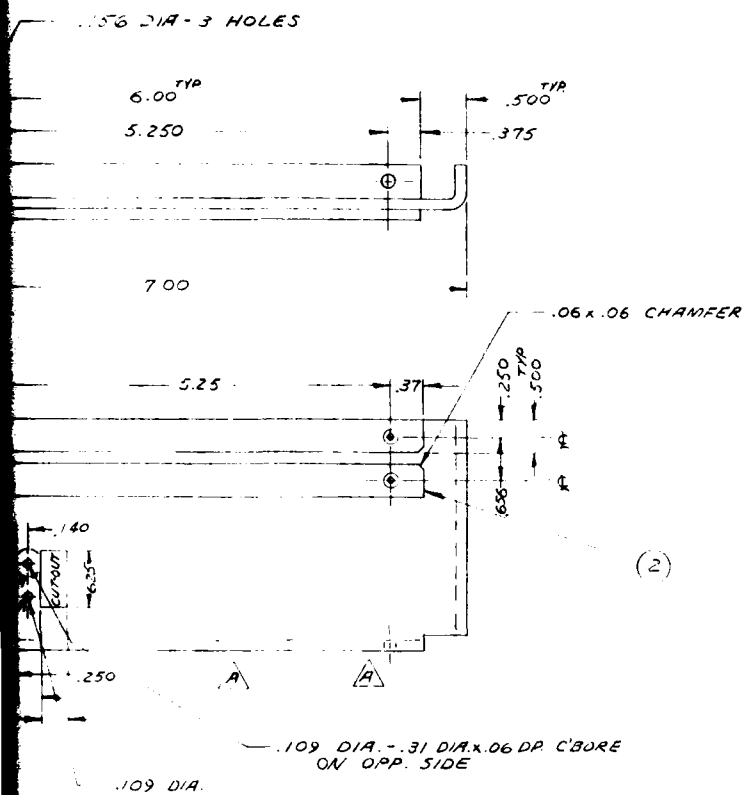
- PART (1) - AS SHOWN.
- PART (2) - AS SHOWN, EXCEPT OPP HAND, OMIT HOLES (2) MARKED "A" & CUT-OUTS (2).

FINISH ALODINE OR EQUIV.
NOTE:

4	3	2	1	3	4	RIVET, POP
				2	5	GUIDE
				1	1	BRACKET
GROUP				FIND NO	QTY REQ	DESCRIPTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES				DRAFTER	DES	WJ COOK
TOLERANCES ON DECIMALS				CHECKER	JOHNSON	1/8/79
XX ± .02				ENGINEER		
XXX ± .005				RELEASE	3/1/80	
REMOVE ALL BURRS AND SHARP EDGES				PROJECT	4920	330103
NEXT ASSEMBLY				CODE IDENT NUMBER		
E 070648-0				DO NOT SCALE		

FIGURE A.7.3. CARD GUIDE BRACKET

CHANGE LETTER	BY	DATE	CHANGES
A	WJ	1/16	DELETED 2 HOLES, .127 & .281 DIA.



C-00048-3

4	3	2	1	FIND NO.	QTY REQ	DESCRIPTION	PART NO.	MATERIAL	
				3	4	RIVET, POP		AL.	.12 DIA.
				2	2	GUIDE		PHENOLIC	.125 T
				1	1	BRACKET		AL 5052-H32	.125 T
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES				DRAFTER		DATE	THE		
TOLERANCES ON DECIMALS				DES: W.J. COOK		1/18/79	MITRE		
XX ± .02				CHECKER		1/18/79	BEDFORD MASSACHUSETTS		
XXX ± .005				ENGINEER			TITLE		
REMOVE ALL BURRS AND SHARP EDGES				RELEASE		1/18/79	CARD GUIDE BRACKET		
NEXT ASSEMBLY				PROJECT		4920	SIZE		
E 000648-0				CODE IDENT NUMBER		330103	DRAWING NUMBER		
				DO NOT SCALE			C 000648-3		
				SCALE		1.1	SHEET		

DEB TYPE 1 ALARM STATUS

		RADIO	RADIO	T1-4000	T1-4000	T1-4000		
		#1	#2	#1	#2	#3	CY-104	CY-104
DOOR	FIRE	XMTR	XMTR	MAJOR	MAJOR	MAJOR	#1	#2
		RCVR	RCVR	3-LEVEL	3-LEVEL	3-LEVEL		MAJOR
							OFF	
							EXTERNAL	ALL
							ALARM	

FIGURE A.7.5. SILK SCREEN - FRONT

T1-4000	T1-4000	T1-4000				
#1	#2	#3	CY-104	CY-104	CY-104	CY-104
MAJOR	MAJOR	MAJOR	#1	#2	#3	#4

3-LEVEL	3-LEVEL	3-LEVEL	MAJOR	
			OFF	RESET
			ALL	
EXTERNAL				
ALARM				

THE
MITRE
CORPORATION

FIGURE A.7.5. SILK SCREEN - FRONT

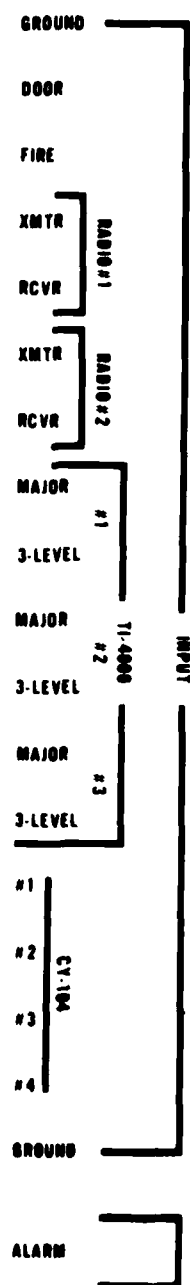


FIGURE A.7.6. SILK SCREEN - REAR

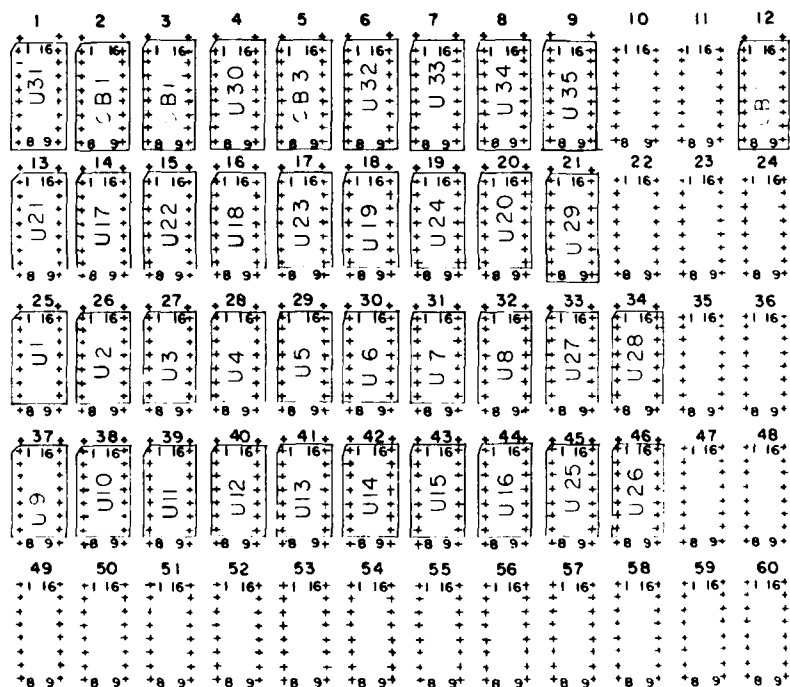
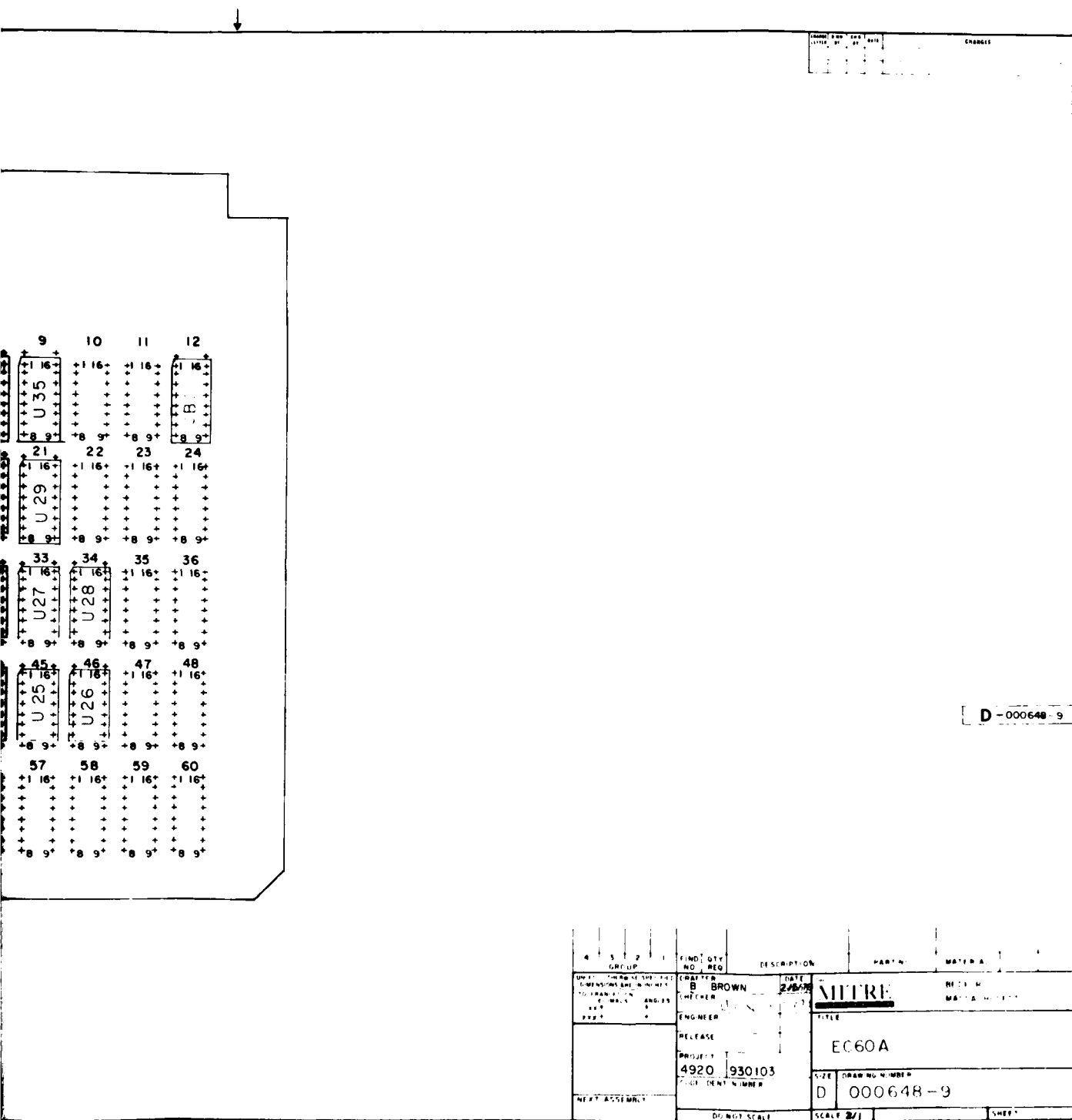


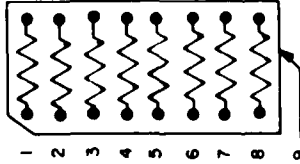
FIGURE A.7.7. WIREWRAP ASSEMBLY



4	3	2	1	GROUP	IND. QTY NO. REQ.	DESCRIPTION	PART N.	MATER. A.
UNIT: THRU HOLE DIA. 1/16"					CRATER	DATE: 2/8/68	REVISION	
DIMENSIONS ARE IN INCHES					B BROWN	MITRE		MATERIAL
TO FRONT - N					ENGINEER	TITLE		
BY: [blank]					ENGINEER	EC60A		
CHK: [blank]					RELEASE	SIZE: DRAWING NUMBER		
PROJECT: 4920					930103	D 000648-9		
NEXT ASSEMBLY					SCALE: 3/1		SHEET	

FIGURE A.7.7. WIREWRAP ASSEMBLY

1 BY 1/4" PAPER



QTY	NO	REG	DESCRIPTION	PART NO	MATERIAL
9	1		616 CGI-AUGAT	19-06-043	
8	1		24K 1/8 W		
7	1		24K 1/8 W		
6	1		24K 1/8 W		
5	1		24K 1/8 W		
4	1		24K 1/8 W		
3	1		24K 1/8 W		
2	1		24K 1/8 W		
1	1		24K 1/8 W		

DESIGNED BY: BROWN

CHECKED BY: JOHNSON

DATE: 1/1/74

BY: BROWN

DATE: 1/1/74

RE: CASE

4920 930103

COMPONENT BOARD

#1

SIZE: 11" x 17"

SCALE: 1" = 1"

SIZE: 11" x 17"

SCALE: 1" = 1"

SIZE: 11" x 17"

SCALE: 1" = 1"

FIGURE A.7.8. COMPONENT BOARD #1

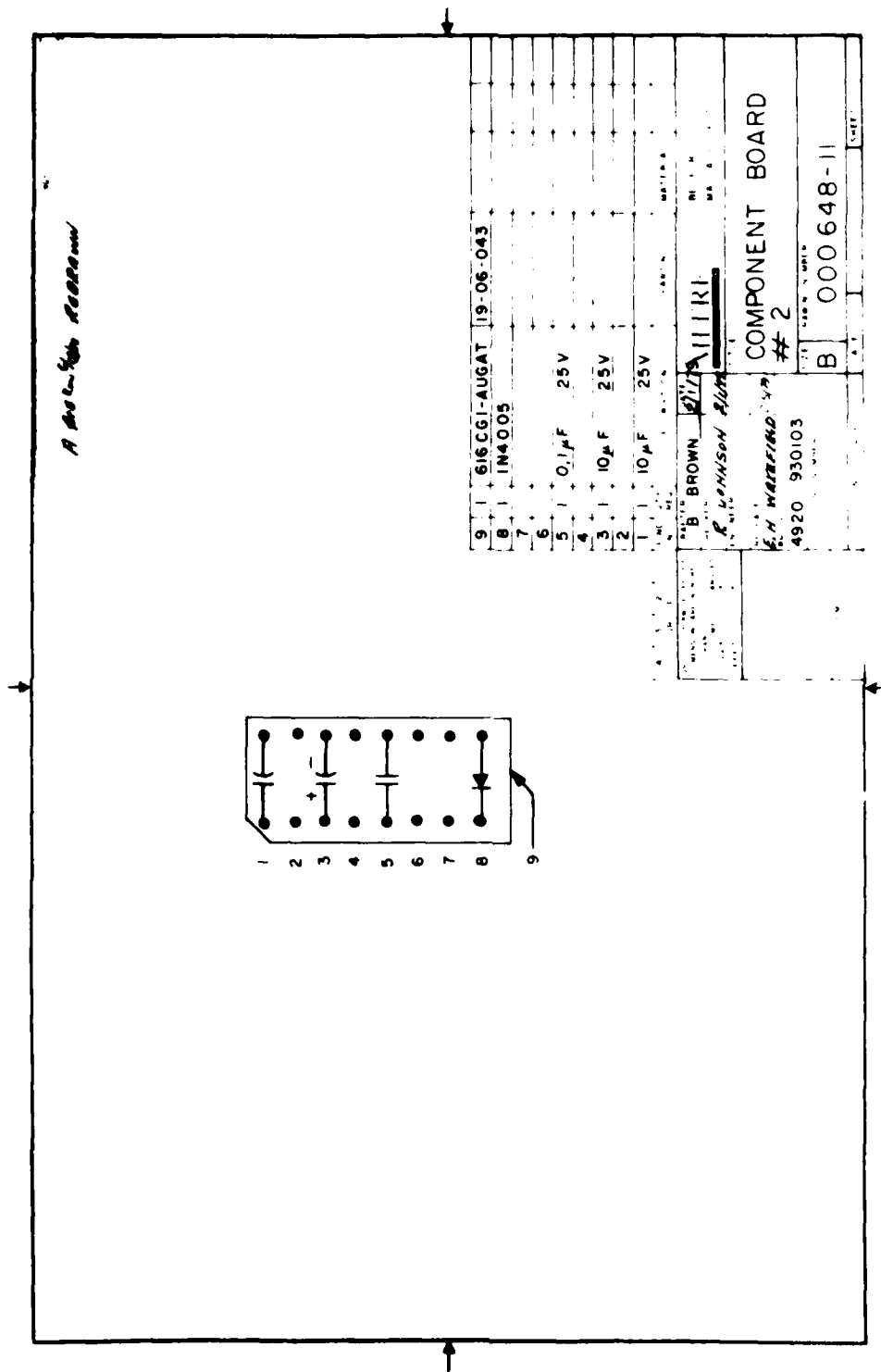


FIGURE A.7.9. COMPONENT BOARD #2

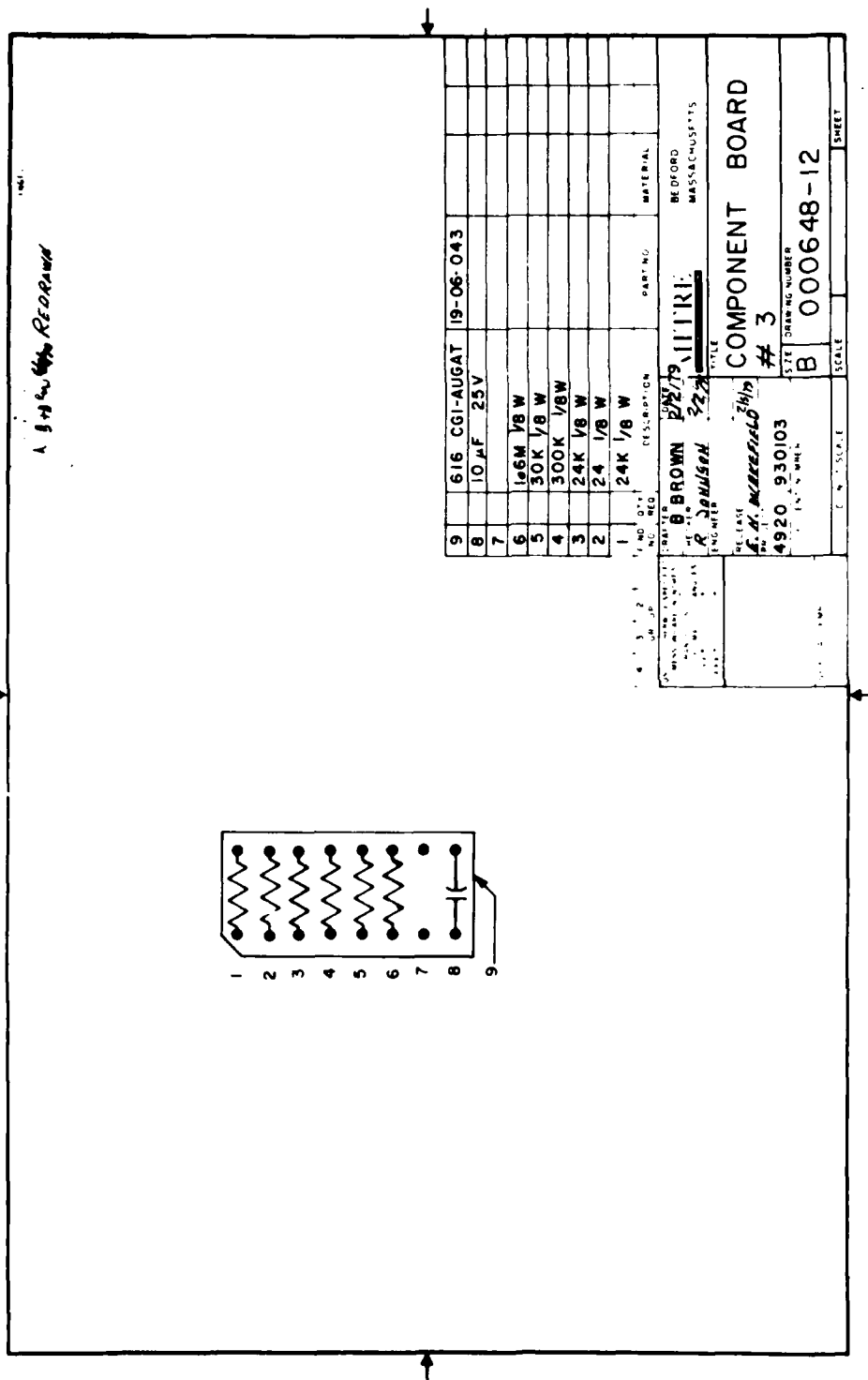


FIGURE A.7.10. COMPONENT BOARD #3